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Supporting Information

Optical identification of few-layer antimonene crystals

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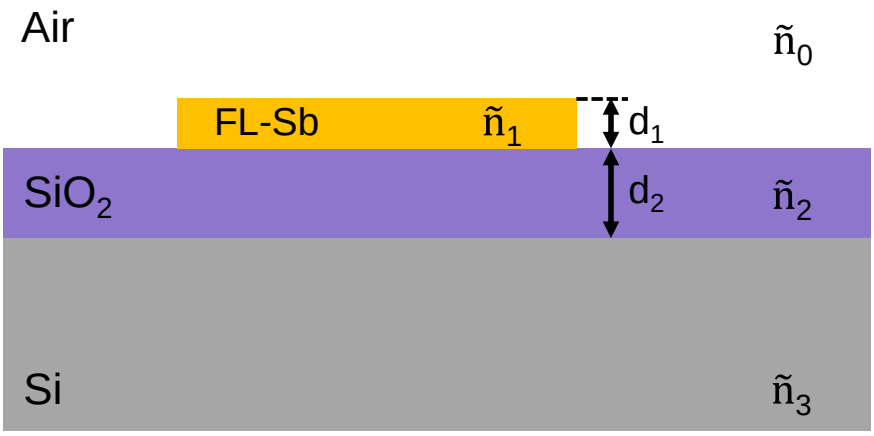

Fig. S1 Schematic diagram of the experimental setup

Sellmeier equation

We have used the two-pole Sellmeier equation, which is commonly used to determine the dispersion of light in a medium. It takes the form:

$$n^2(\lambda) = A + \frac{B_1\lambda^2}{\lambda^2 - C_1} + \frac{B_2\lambda^2}{\lambda^2 - C_2}$$

where n is the refractive index and λ the wavelength. The first and second terms represent, respectively, the contribution to refractive indexes due to higher energy and lower energy gaps of electronic absorption. The last term accounts for the decrease in refractive indexes due to lattice absorption (Ghosh, G. *et al.*, Journal of Lightwave Technology 1994, 12, 1338-1342).

Fig. S2 shows the fits of the refractive index and extinction coefficient to the two-pole Sellmeier equation.

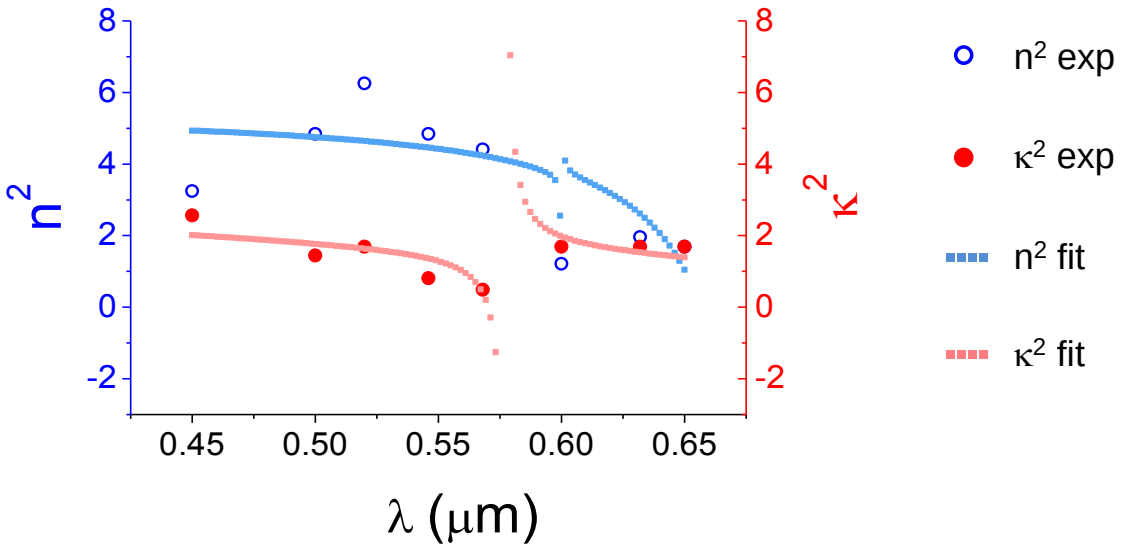

Fig. S2 Refractive index *vs.* wavelength fits to the two-pole Sellmeier equation (the obtained values for the resonances within the visible spectrum are C_1 = 0.36 and 0.33 μm^2 for n and κ respectively, corresponding to resonances at λ = 600 and 574 nm).

Although Sellmeier equation is an approximated expression, the fits to the experimental data are reasonable, showing an absorption resonance around 580-600 nm that could be related to the presence of a gap of electronic absorption around these values, as mentioned in the manuscript.

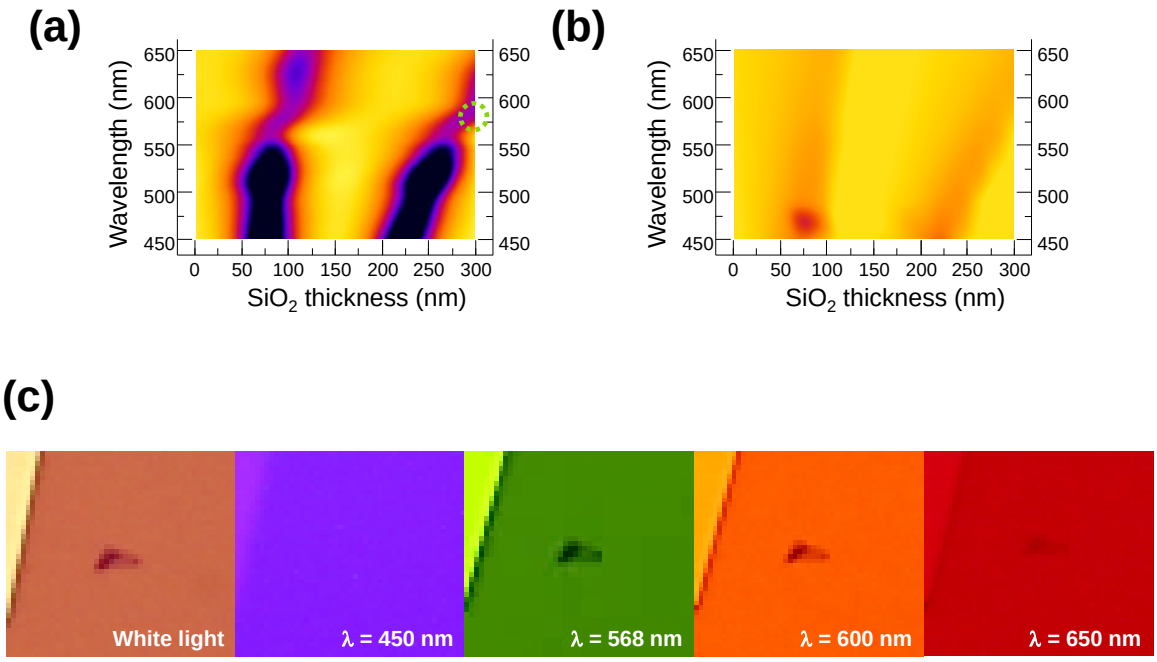

Fig. S3 a) Optical contrast as a function of incident light wavelength and SiO_2 layer thickness for monolayer antimonene from the obtained complex refractive index. b) Same as in a), but in this case complex refractive index has been estimated after Singh, D. *et al.*, *J. Mater. Chem. C* **2016**, *4*, 6386-6390 theoretical calculations. The behavior of the contrast is similar in both cases, presenting the same two characteristic negative contrast bands. Contrast ranges from -0.09 to 0.01 in both plots. c) Optical images at white light and different wavelengths of one of the thinnest flakes deposited on 300 nm thickness SiO_2/Si substrates. The best identification can be performed at 568 and 600 nm wavelengths, in good agreement with the optimal value obtained from the contrast plots (which corresponds to the wavelength inside the green dotted circle in a), ~ 580 nm).